CLAIMS

1. Method of inserting a wave winding into a stator of a polyphase rotating electrical machine, the stator (1) comprising laminations (10) with a hole through the centre and having an axis of symmetry (20) and slots (30) passing through axially made in a radially inner face of the laminations (10), these slots (30) providing a plurality of receiving positions arranged in tiers radially, the winding comprising a plurality of phase windings (70) each consisting of an electrically conductive continuous wire (60), the method comprising the following steps:

1) shaping each winding (70), the wire (60) thereof being formed into a succession of crenellations (71) connected by linking segments (72), each crenellation comprising two lateral branches (711) facing one another each intended to be inserted at a receiving position of a slot (30), and a top branch (712) connecting the two lateral branches (711);

2) placing the windings (70) on an insertion tool (80);

3) inserting the turns (73) into the slots (30) of the stator,

characterised in that step 2) of placing the windings is implemented on a cylindrical insertion tool (80), each winding (70) constituting several turns (73) around the insertion tool (80), these turns (73) being superimposed in a given order,

and in that the windings (70) are wound around the insertion tool (80) at the same time, the turns (73) that follow one another in said given winding order belonging alternately to the different windings (70).

2. Method according to Claim 1, characterised in that step 3) of inserting the turns (73) into the slots (30) of the stator is implemented in the reverse order to the winding order, the lateral branches (711) of these turns (73) progressively occupying radially more inner positions.

3. Method according to Claim 1, characterised in that the winding order comprises a succession of identical sequences, each sequence consisting of one turn (73) of each winding (70).

4. Method according to Claim 1, characterised in that, on the insertion tool (80), the crenellations (71) extend in respective planes parallel to the axis of symmetry of the insertion tool (80), or slightly inclined with respect to this axis.

5. Method according to Claim 1, characterised in that step 3) of inserting the windings (70) into the slots (30) is implemented by moving the insertion tool (80) along the axis of symmetry (20) of the stator (1).

6. Method according to any one of the preceding claims, characterised in that the top branches (712) of the crenellations (71) are curved and form a winding overhang (40) on a first axial side of the stator (1).

7. Method according to Claim 6, characterised in that the linking segments (72) connect two respective lateral branches (711) of two neighbouring crenellations (71) along the wire (60) and have a curved shape, these segments forming a winding overhang (40) on a second axial side of the stator (1) opposite to the first.

8. Method according to Claim 7, characterised in that the top branches (712) and/or the linking segments (72) formed at step 1) have increasing or decreasing heights along the windings (70).

9. Method according to Claim 8, characterised in that the turns (73) whose lateral branches (711) are inserted in radially outer positions of bottoms of slots (30) have top branches (712) and/or linking segments (72) with heights relatively greater than the turns (73) whose lateral branches (711) occupy radially inner positions.

10. Method according to Claim 1, characterised in that it comprises, after step 3), a step 4) of shaping the winding overhangs (40) by inclining the linking segments (72) and/or the top branches (712) towards the inside.

11. Method according to Claim 1, characterised in that it comprises, after step 3), a step 4) of shaping the winding overhangs (40) by inclining the linking segments (72) and/or the top branches (712) towards the outside.

12. Method according to Claim 1, characterised in that it comprises, between steps 1) and 2), a step 1') of local shaping of the wire (60) in areas (61) of this wire intended to cross other wires (60), or other areas of the same wire (60), once the windings (70) have been inserted into the stator (1).

13. Method according to Claim 1, characterised in that the wire (60) has a round cross-section, the slots (30) having a circumferential width that is a multiple of the diameter of the wire (60).

14. Method according to Claim 13, characterised in that the slots (30) have a circumferential width corresponding to the diameter of the wire (60), the lateral branch (711) occupying the radially most inner position being deformed by broadening in a circumferential direction so as to hold the lateral branches (711) occupying the other positions inside the slot (30).

15. Method according to Claim 13, characterised in that the slots (30) have a circumferential width equal to at least two diameters of the wire (60) and have on a radially inner side an opening (31) partially closed on two opposite sides by two axial steps (32), the lateral branches (711) occupying the slots being held inside it by a flat wedge (33) resting on the steps (32) on an inner side of the slot (30).

16. Stator of a polyphase rotating electrical machine, comprising laminations (10) with a hole through the centre having an axis of symmetry (20), slots (30) passing through axially made in a radially inner face of the laminations (10) each providing a plurality of receiving positions arranged in tiers radially, and a winding (50) comprising a plurality of phase windings (70) each consisting of an electrically conductive continuous wire (60);

the wire of each winding (70) being formed into a succession of crenellations (71) connected by linking segments (72), each crenellation comprising two lateral branches (711) opposite one another each coming to be inserted at a receiving position of a slot (30), and a top branch (712) connecting the two lateral branches (711);

each winding (70) constituting several turns (73) around the stator (1);

characterised in that the turns (73) of the windings (70) are inserted into the slots (30) in a given order, the lateral branches (711) of these turns (73) progressively occupying radially more inner positions, and in that the turns (73) that follow one another in said given order belong alternately to the different windings (70).

17. Stator according to Claim 16, characterised in that the given order comprises a succession of identical sequences, each sequence consisting of one turn (73) of each winding (70).

18. Stator according to Claim 16, characterised in that the wire (60) is shaped locally in areas (61) of this wire crossing other wires (60) or other areas of the same wire (60).